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ABSTRACT

All first-year students enrolled in diploma and certificate programs in the Saskatchewan Institute of Applied Science and Technology (SIAST) were surveyed to determine factors that influence student persistence. A questionnaire was mailed to 2,822 students in October 1991; 1,557 completed questionnaires were received and analyzed. A follow-up questionnaire was sent to respondents in June 1992; 720 completed questionnaires were received, 105 from noncompleters. In the literature search on student retention and attrition, past studies fell into five categories: psychological, societal, economic, organizational, and interactional. The survey data found that working conditions and personal interest/aptitude were more important to noncompleters in determining career choices. Noncompleters were less certain about career choices, expressed less goal commitment, and had set themselves lower final educational goals. Noncompleters used tutorial help, counseling, and computer and library facilities more frequently. Noncompleters were more likely to have disabilities, be female, be married, have dependent children, and be more influenced by current economic conditions. The study tested the hypothesis that unemployment rates in particular occupations are inversely related to attrition rates in programs preparing for this field by examining the health, business, industrial, and technology sectors. The hypothesis could not be proven for all specific programs, but the inverse relationship held true for broad sectors in general. (Contains 78 references.) (YLB)

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Factors Affecting Retention of First-Year Students in a Canadian Technical Institute of Applied Science and Technology

A Paper Prepared for the:

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SIAST Retention Study

Factors Affecting Retention of First-Year Students in a Canadian Technical Institute of Applied Science and Technology

Gerlinde Sarkar

INTRODUCTION

Student attrition has been the focus of investigation for many years. Some have argued that student completion rates are a fundamental measurement of student success (or the institution's success in meeting the needs of its students). However, in recent years the validity of assuming that attrition suggests somehow failure has been questioned, and it is now more the concern for the waste of human and financial resources that have fuelled the interest in investigating why students exit a program. Researchers found it more useful to study the reasons why post-secondary students drop out and what factors may impact on persistence so that the institution can develop specific policies and practices to enhance student retention.

Determining the factors that impact on student persistence was the primary purpose for the study conducted by the Saskatchewan Institute of Applied Science and Technology (SIAST). Once we identify what factors influence student persistence, the institution can develop policies to support those students most at risk of becoming non-completers.

BACKGROUND

The Saskatchewan Institute of Applied Science and Technology (SIAST) is a provincial technical institute located at the four major cities in the province of Saskatchewan. It was formed in 1987 through an amalgamation of four urban community colleges, four provincial technical institutes and an Advanced Technology Training Centre and it is governed by a Board. Prior to the amalgamation, the various institutions came under the jurisdiction of the Department of Education. Minimal data had been kept on student retention. It became apparent that there was a need to know the retention rates at the four institutes and in specific programs.

The Planning and Research office of SIAST undertook to develop a model to elaborate the various criteria that affect retention, such as goal commitment, student characteristics, educational ability, academic integration, social integration and labour market conditions. Where the SIAST study differs from the numerous other studies on retention is that the SIAST study also considers retention as a function of the fluctuations in economic conditions. Employment in certain occupations is more strongly affected by cycles in the economy and this may impinge on student persistence.

METHODOLOGY

Primary research was undertaken by surveying all first year students enrolled in diploma and certificate programs in two stages. Certificate students normally complete their program in one year, whereas diploma students normally follow a two year program. For Part I, a questionnaire was mailed in October 1991 to all first year Certificate/Diploma (C/D) students enrolled as of September 30, 1991 (the list of addresses for 2,822 students was supplied by the respective Registrars from the four institutes). 1,557 completed questionnaires (or 55 percent of the census sample) were received and analyzed for Part I. For Part II, a follow-up questionnaire was sent to the respondents to the first questionnaire in June 1992, the time at which most programs would have completed the first year of studies. 720 completed questionnaires were received for Part II, a response rate of 47 percent. 105 respondents identified themselves as non-completers, an attrition rate of 14.5 percent of Part II respondents. The analysis compared the responses of these non-completers to the responses of the general sample to determine significant differences.

LITERATURE SEARCH

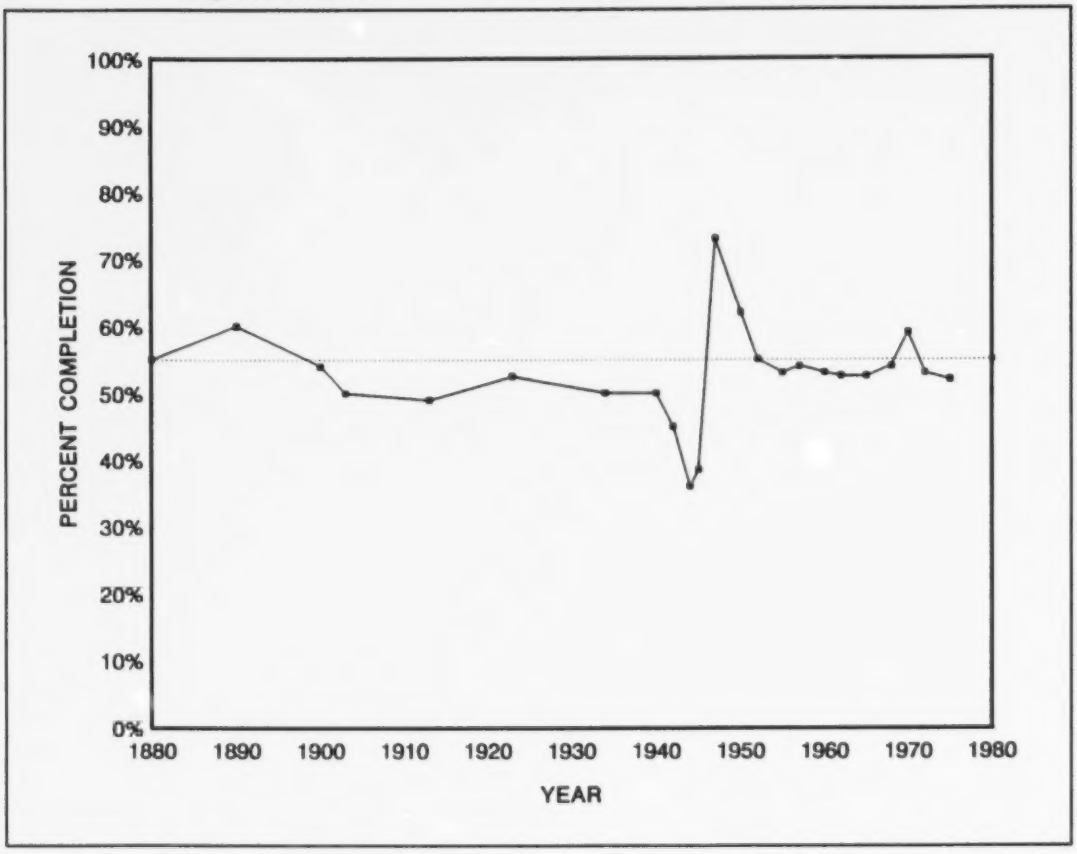
An extensive literature search on the topic of student retention and student attrition was conducted prior to undertaking this study. The studies and articles that have been examined as secondary data sources are enumerated in the list of references.

There are many studies dealing with retention of traditional college-age students. While most of the available studies are from the United States, the published Canadian studies *(Anisef, Paasche, & Turritin, 1980; Jones & Denison, 1972; Lam, 1984; Mehra, 1973; Pascal & Kanowitch, 1979; Ungar, 1980)* do not differ substantially from the United States studies.

In a 1982 article by Tinto, whose work on attrition has influenced thinking in higher education regarding student attrition since his first study in 1975, aggregate attrition rates in America have remained surprisingly constant over the past 100 years. (See Figure 1.)

With the exception of the period during and immediately following World War II, dropout rates have remained at about 45 percent. After an understandable decline in completion rates during the war, a large number of veterans took advantage of the GI Bill to re-enter higher education after the war. Degree completion rates were calculated by the ratio of the number of BAs or first professional degrees given in any one year to the number of first-time degree enrollments four years earlier.

Figure 1 **BA Completion Rates in Higher Education 1880 - 1980 with Estimated Regression Line**



Source: Vincent Tinto, "Limits of Theory and Practice in Student Attrition", Journal of Higher Education, 1982. Vol. 53. No.6. page 694. Ohio State University. 1982.

Similar figures have been reported for non-degree granting post-secondary institutions. An analysis of withdrawal from the Colleges of Applied Arts and Technology of Ontario (CAATs) between 1974 and 1979 *(Stoll & Scarff, 1983)* found **total student withdrawal rates from 44.1 to 47.1 percent.**

Summary of Literature Search

Past studies can be categorized as falling roughly into one of five categories, depending on the emphasis they give to individual and environmental forces:

psychological
societal
economic
organizational
interactional

Psychological Theories on Student Persistence focus on individual personality traits, which distinguish those students who persist from those who do not complete their program of study. Retention is viewed as being dependent upon the individual's ability to complete successfully the requirements of the institution.

Societal Theories stress the roles of social status, race, prestige, and opportunity relative to student persistence, or they examine the barriers and hurdles that students have to overcome. External forces are stressed in the process of student retention.

Economic Theories of student departure emphasize the importance of individual finances and financial aid in student retention. There is little evidence to support the contention that financial forces are paramount to individual retention decisions. The financial situation was taken into account in the decision regarding entry, that is where and whether to attend in the first place. *(Manski and Wise, 1984.)* When students' experiences are positive they are more likely to accept greater financial burdens in order to continue their attendance. *(Tinto, 1982; Collins, Turner, and Maquire, 1979.)*

Organizational Theories stress the impact of such variables as size of institution, student/teacher ratios, institutional goals and organizational structure on student departure rates. These factors appear to be more important in residential degree-granting institutions. Interactional Theories look at the fit between what a student expects from an institution and how well he/she integrates into the social and academic environment. Tinto's 1975 study is the major work in this area. Pascarella and Chapman in a 1983 study found that academic integration had an effect on institutional commitment for both four year and two year commuter post-secondary institutions, but social integration had no effect on persistence. Voorhees studied the social integration model on community colleges. He suggested that academic integration may be less important in explaining persistence of community college students compared to four-year University students. Women had higher levels of persistence. Students indicating that their purpose for attending was "self-improvement or "other" had the lowest persistence rates. *(Voorhees, 1987.)*

Until recently most research has focused on traditional full-time students participating in four-year degree program studies. Part-time students, two-year college/institute and continuing education students who are generally older have received relatively little attention. Older students probably leave higher education for reasons far different from those identified in Tinto's model of student attrition. For example, social integration, important in Tinto's model, appears to have little empirical support as a reason for explaining non-traditional college attrition. *(Gree, 1980; Metzner and Bean, 1987; Pascarella, Duby and Iverson, 1983.)*

Since goal commitment is an important variable in many studies, we must first examine what this goal is for non-traditional[1] students.

It has long been assumed that "completion of the program of studies undertaken" **should** be the goal of the student; however in effect, especially the older student may have a different goal. Students who do not intend to finish a certificate or diploma when entering a program should not necessarily be considered as having dropped out. The student's goal may be "to be able to find employment", when they do, hence when the goal is achieved, they leave the

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[1] The non-traditional student was defined as older than 24 and/or a commuter and/or part-time (Metzner and Bean, 1987, p.18). Many of SIAST's students would be considered non-traditional under this definition.

program. We should therefore re-evaluate our definition of "attrition". The word carries many negative connotations and suggests failure, when in effect students have achieved what they set out to achieve. We examined the goals or reasons for entering a post-secondary program in our study and found that completion was not always the most important goal.

RESULTS OF THE STUDY

We examined a number of factors that are often identified with student persistence. The SIAST study set out to validate these factors as influencing retention for our own group of first year students at SIAST. We added another factor "labour market condition" to the list.

The SIAST Retention Study examined the impact of the following factors on retention:

1. reasons for taking program
2. goal commitment
3. educational ability
4. academic/social integration
5. satisfaction/use of services
6. student characteristics
7. labour market conditions

The responses of those who were identified as non-completers in Part II were tagged in the database of Part I and then compared to the overall respondents for significant differences. We found that non-completers differed on all of these factors with the exception of #4 academic/social integration.

Reasons for Taking Program

We examined the reasons why students had entered SIAST and how committed they are to the completion of the program.

Working conditions and personal interest/aptitude are more important to non-completers in determining career choices. Acquiring skills to change careers was a stronger motivating factor for non-completers. Non-completers had lower educational goals.

Goal Commitment

Non-completers are less certain about their career choices, expressed less goal commitment, and had set themselves lower final educational goals. Twice as many non-completers stated two months after enrolment that they would definitely take a job right now rather than finish the program if they were offered a job requiring their skills.

Educational Ability

Previous educational achievement was lower for non-completers. Three times as many respondents from the total sample said that their high school grades were "excellent - over 80 percent" compared to non-completers.

Academic/Social Integration

There was no significant difference between non-completers and the total sample in terms of social and/or academic integration measured by the participation in various activities and groups relating to these areas.

Satisfaction/Use of Services

Tutorial help, counselling, and computer and library facilities were more frequently used by non-completers. Sessions to improve study skills, tutorial sessions, and instructor office hours are perceived by non-completers to have greater impact on program completion.

Student Characteristics

Non-completers are more likely to be disabled, of aboriginal ancestry, female, married, have dependent children. They are more frequently employed and work more hours. Non-completers are generally older; proportionately twice as many non-completers are over 35 years old.

The percentage of unemployed prior to entering SIAST was twice as high for non-completers. For non-completers family responsibilities were significantly more important reasons for transfer or withdrawal from previously attempted post-secondary programs.

Labour Market Conditions

Non-completers were more influenced by the current economic conditions. A higher percentage of non-completers stated that they would accept a job in preference of completing their program depending on future job prospects and the state of the economy. The preference for taking a job over completing the program may be a reflection of the fact that the percentage of unemployed prior to entering SIAST was twice as high for non-completers.

Although many of the studies on student persistence recognize the importance of outside influences, little emphasis is placed on the relationship between the student's decision to persist or to drop out and the broader economic environment. How does the labour market, prevailing unemployment rates in particular, affect attrition? We examined this factor in more detail and present the results below.

Since 97.7 percent of our sample believe that their prospects of finding employment are increased by having a certificate or diploma compared to a person without such a diploma, and since 95.3 percent of respondents believe that they will be able to earn a higher income with a certificate or diploma than without such qualifications, we make the assumption that persistence would be tied to perceived job opportunities.

We know that occupations are influenced by the ups and downs of the economy. Some occupations are more sensitive to economic fluctuations than others. As a proxy of this sensitivity, we took the variance of sectorial unemployment rate relative to the overall unemployment level. We make the assumption that occupations that are less sensitive have lower unemployment rates in recessionary times than the aggregate unemployment rate. To

gain employment in these types of occupations, it is relatively easy and there is less incentive to complete a certificate or diploma. On the other hand, if occupations have higher unemployment levels than the overall unemployment levels prevailing at recessionary times, holding a certificate or diploma would give an extra edge to find employment in these types of occupations.

In essence, **if it is relatively easy for students to find employment they are less likely to complete the program, other factors held constant.**

In recessionary times we have generally observed that more students are returning to post-secondary institutions. This trend has been reported in the media on various occasions. "Not only have many schools been overwhelmed with new students, but they are welcoming record numbers of returning students as well." *(Globe and Mail, Oct. 3, 1992, p.A1.)*

"Administrative records show a significant rise in school, college and university enrollment **(and retention)** during the recent recession. With reduced or non-existent job opportunities, many job seekers are adopting various educational strategies to improve their employment strategies." *(Canadian Economic Observer, Statistics Canada - Cat. No. 11-010, October 1992.)*

We make the assumption that the reason for the decision to seek further education is the students' belief that this will give them a competitive edge in the job market. If this is indeed the motivation, it would therefore seem to be reasonable to assume that more students would make an attempt to complete their studies, especially in fields of high unemployment.

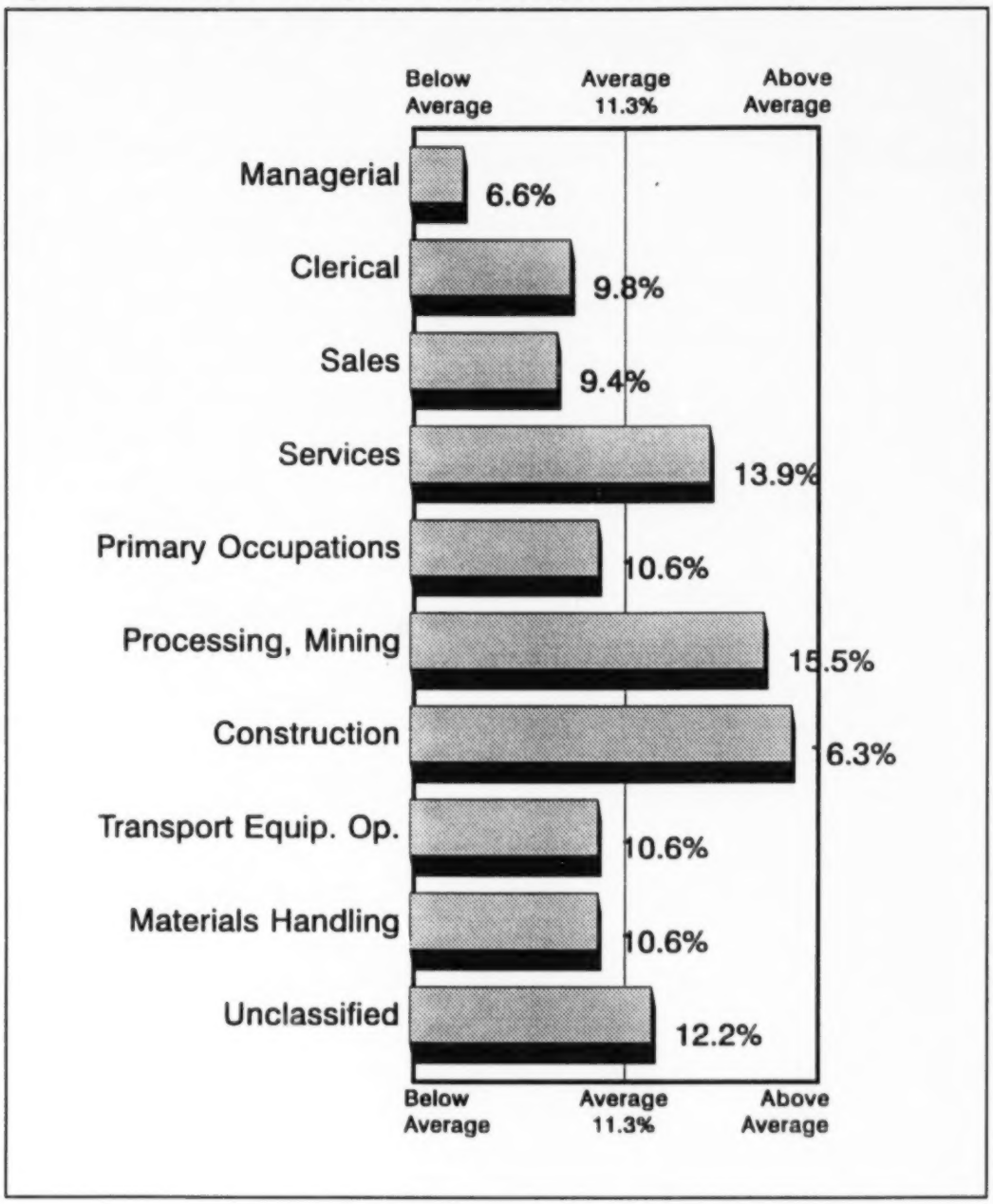
Are students more likely to persist in completing their certificates, diplomas or degrees when opportunities for employment are few, or are they more likely to switch halfway through a program to get into a field that has more employment potential? These were the questions that were asked and for which we wanted to find some answers.

Employment fluctuates more for some industries than others. For example, employment in health, education and adminstration is more stable; fewer lay-offs as a direct result of a downturn in economic activities since schools still need teachers and hospitals still need nurses and other health care professionals regardless of the economic conditions. Of course, these sectors are still affected indirectly by the economic activities since an erosion of the tax base generates fewer revenues, and hence, means cut-backs in spending. However, manufacturing, construction, mining and processing, new exploration or development are much more directly and immediately affected by a recession. When the demand for products is declining, as is the case in a recession, massive lay-offs in manufacturing plants are a common occurrence and the relative unemployment in these industries is well above the national overall averages at that time.

We set out to study relative unemployment rates for specific industries and occupations. Statistics Canada regularly produces unemployment data broken down by various demographic variables as well as by occupations and industries. In an excellent article "Unemployment - Occupation Makes a Difference" occupations are broken down into quartiles depending on their unemployment rates and these are tracked over time to see the rate of growth of employment in a recovery and decrease of employment in recessionary times. *(Gower, Perspectives, Winter 1991, Statistics Canada.)*

The Statistics Canada office in Regina provided the following information from their database.

Figure 2 Estimates of Unemployment by Occupation, Canada, July 1992



Saskatchewan Unemployment rates vary quite significantly from Canada's overall rates. We are not a manufacturing based economy and therefore our unemployment rates fluctuate less widely. In addition, Saskatchewan has experienced out-migration of its young unemployed people which understates the true unemployment rates. In August 1992, unemployment in Canada climbed to 11.4 percent while it was 8 percent in Saskatchewan, with Regina at 8.3 percent and Saskatoon at 11.3 percent. *(Sask Trends Monitor, September 1992.)* Therefore taking national unemployment rates was not a satisfactory measure of determining what employment opportunities exist for SIAST graduates, and we decided to compare attrition and completion rates to the success that SIAST graduates of the previous year had in terms of finding employment. We capture such information on a regular basis through our annual Graduate Employment Survey, which is conducted about six months after graduation. Total employment rates, as well as training related employment, broken down by full- and part-time are available. Graduates finding employment outside the province are included in these figures. The percentage of those that had to leave the province to find employment has dropped over the years (in tune with a general slow-down of the rate of out-migration).

TABLE 1. Percent of SIAST Graduates Who Found Employment Outside the Province Based on the Graduate Employment Survey (GES).

Year of Graduation	% Employment Outside the Province
1988	19%
1989	18%
1990	15%
1991	14%

We took the success rate of our graduates of finding employment as a proxy indicator of the relative competitiveness in the job market. When looked at in this way, we found some overall conclusions.

If it is was relatively easy to find employment (training related or non-training related) students were less likely to complete the program. If certification was a desired requirement for employment, students were more likely to persist in the program in order to get that competitive edge in the job market.

TABLE 2. Attrition Rates of SIAST First Year Certificate/Diploma Students (1991-92)

	Completion Rate *	Attrition Rate	Attrition Rate (results of Part II of the Study)	Total Employed 1991 Graduates**	Total Unemployed 1991 Graduates**
All SIAST Totals (includes respondents from all programs surveyed)	60%	24%	15%	78%	13%
SIAST Business Group	46%	39%	23%	76%	17%
SIAST Health Group	76%	18%	7%	85%	12%
SIAST Industrial Group	63%	19%	12%	72%	24%
SIAST Technology Group	50%	24%	24%	80%	14%

* Based on data received from the Registrars.

** Source: Employment Statistics Report, 1991 Graduate Employment Survey. Includes full and part-time and training related as well as non-training related employment.

Note:

Completion rates plus attrition rates, based on data supplied by Registrars, do not equal 100 percent. A number of students have not completed the first year of the program, they may have reduced the work load to part-time study or wish to take some time out (leave of absence); they have not stated that they have left the program or "dropped out". At Wascana and Woodland Institutes programs are offered in a competency-based delivery mode, which allows students to progress at their own speed, hence they may not have completed the program in one year.

Also employed and unemployed to not add up to 100 percent since some graduates are not in the labour force (category: unemployed, but not looking for work).

The sectors (eg. business, health, etc.) are composed of the same programs to calculate the attrition rates. They do not necessarily reflect all programs offered by SIAST in that area, only those for which we had sufficiently large response rates per program for Part II of the study were used.

The SIAST Study confirms the findings of other research in this area *(Farabaugh-Dorkins, 1991)* that students who complete their program are more likely to respond to surveys and female students are more likely to respond to surveys.

Attrition rates are lower for the respondents of Part II of our study (more students had completed the program) compared to the rates calculated from Registrars' records. We also noted that response rates for Part I of the study were significantly higher for Wascana Institute, where 68 percent of the students are female.

We will now examine some of the sectors in detail to test our hypothesis.

Hypothesis: ***Unemployment rates in particular occupations are inversely related to attrition rates in programs preparing for this field.***

Health Sector (attrition rate 7 percent)

At first glance this sector does not support the hypothesis. Nursing and other health related occupations have traditionally had a low unemployment rate and low attrition rates. In 1990, when the overall unemployment rate was 8.4 percent *(Gower, Perspectives, Winter 1991, Statistics Canada, p. 15, Labour Force Survey)* nursing had a 3.4 percent unemployment rate. However, these figures do not reflect the shift from full-time to part-time employment in the health sector. We have seen an erosion of full-time jobs for SIAST Diploma Nursing graduates over the past years, from a high of 79 percent full-time training related employment for Diploma Nursing graduates in 1987 to a **low of 19 percent full-time training related employment** for Diploma Nursing graduates in 1991 *(SIAST/SaskEd Graduate Employment Survey)*. Therefore, a combined full-time and part-time employment of 80 percent as stated in the 1991 Graduate Employment Survey is very misleading of the true job opportunities.

Many occupations in the heath sector are highly regulated with associations licensing the practitioners. The completion of a certificate or diploma is thus a necessary prerequisite for being allowed to practice, hence students are more motivated to complete the program since this will significantly increase their probability to secure employment in a tight job market.

Since it is becoming more difficult to find jobs, students believe that they will gain an extra edge by completing their certificate or diploma, and hence they are more likely to persist in their studies. Attrition rates at SIAST for nursing students and other health related programs are below the average, and we find high completion rates (SIAST-wide) in the health field. The attrition rate for the total health sector is 10.3 percent; this includes the Health Record Technician certificate, which has an attrition rate of 28.6 percent, similar to other programs in the business or office education area. If this program is excluded in the calculation, the attrition rate in the health sector drops to 7 percent.

Business Sector (attrition rate 23 percent)

Office Education students are not motivated to obtain a certificate or diploma in the same way as students in health related areas. Occupations are less regulated and employers generally place more emphasis on the demonstration of specific skills rather than a certificate or diploma. Hence, students place more emphasis on acquiring the necessary marketable skills rather than ensuring completion of a full certificate or diploma program. Also employment opportunities are not as specialized as for health workers. Many graduates (and indeed leavers of the program as well) find employment in non-training related jobs. In the health sector only 5 percent found employment in non-training related jobs and these are primarily at the assistant level (hence still related to some degree), compared to 12 percent of Office Education students who find jobs in other fields.

Industrial Sector (attrition rate 12 percent)

Attrition rates fall between those of the health sector and business education sector. Employment in training related plus non-training related jobs is relatively high (70 percent) with a 52 percent training related employment rate which is mostly full-time.

A specific example is the Graphic Arts program, which has a low completion rate and high employment levels. 75 percent of graduates found full-time training related employment and the other 25 percent did not actively look for work at the time of the survey (not in the labour force). **Overall, the less highly regulated the specific occupation is (by associations or apprenticeship boards) in an environment where alternate jobs (not necessarily training related) are easily available, students are less likely to complete their program to receive a certificate or diploma. In effect, when students have reached their goal (a certain minimum level in marketable skills), they become employable and often this is their own personal final goal not the completion of the program in itself.**

Technology (attrition rate 24 percent)

Employment for technology students is high (80 percent total employment and 64 percent training related employment for 1991 graduates, again mainly full-time), yet attrition rates according to the results of our study were above SIAST overall rates.

A particular example is the Water Resources program. Water Resources students have a high attrition rate (50 percent of the first year students according to the respondents of Part II of our study), yet the employment rate of graduates in the previous year was 100 percent in training related employment.

Although we could not prove our hypothesis (inverse relationship between attrition rates and unemployment rates) for all specific programs, this relationship does hold true for the broad sectors in general.

IMPLICATIONS

At the institutional level there is little we can do to control the fluctuations of economic activities, and hence the resulting changes in job opportunities. However, we can be more aware of these changes and how they affect attrition rates. Students are more persistent when they perceive that this will give them a competitive edge in the job market. Disseminating information about job markets and realistic employment prospects must be an ongoing and available service to students, not only when they first start to think about furthering their education. Students may realize their short term goal of finding employment (without completing the program), but in the long term they benefit from completion by achieving increased marketability and increased flexibility and an increased income potential throughout their working life.

Mentoring, peer-counselling and pairing students with employees in their chosen field for occasional contacts may be services that could be initiated with beneficial results.

We have identified those students that are at higher risk of dropping out and we can now assist these groups with special programs and services.

Non-completers are generally older, female, and have dependent children. The added family responsibilities may mean that programs have to be more flexible to allow for completion at a slower pace over a longer period of time (encourage more part-time study).

Publicizing support services that are available and adapting them to ensure that they are accessible to these students (eg. provide child care services or flexible hours) may be necessary. It may be that services are geared to traditional-aged students which do not accommodate the needs of the older student population with family responsibilities.

Non-completers perceived that sessions to improve study skills, tutorial sessions and more instructor contact had a greater impact on the probability of completing the program. Such services should be offered on an ongoing basis and be readily available. The instructors' teaching loads must of course be adjusted if they are expected to hold frequent office hours in addition to teaching.

For certain courses upgrading in specific areas (eg. science) may be necessary before students can take a full load of classes. This may involve suggesting to students to take standardized tests in certain core subjects to establish whether such academic upgrading is necessary in one or two areas.

Although other studies found that financial problems were generally not the reason why students drop out (costs and financial aid affect the initial decision to enter a program), we found this to be a major reasons in our study. Also non-completers do work more hours in addition to studying. A reduction in the course load (part-time study) would ease the stress.

Any retention program must be longitudinal in character and its success is tied to the implementation and management of such a program.

As we learn more about student persistence and the reasons why students drop out, we can become increasingly effective in dealing with particular reasons and particular subpopulations; however, we must keep in mind that dropout or persistence is to a large degree a reflection of the merits of the educational system in general and how well our institution fits into the overall system of higher education. Since much of the student dropout is actually student transfer among institutions, we also need to consider to what extent we should encourage such movement as a means of fine-tuning the system as a whole.

CONCLUSION

Student persistence is a function of many variables. The varied and changing composition of our student body means that as an institution we must be more aware of the subgroups most at risk of dropping out. If we make the assumption that completing a certificate or diploma brings benefits, such as increased employability and higher potential life time earnings, we have the responsibility to convey this to students and create an environment which is conducive to assist those most at risk. Support services must be accessible to these groups of students and programming itself must allow for greater flexibility. This may involve screening at the admission stage to ensure that students will be provided with the appropriate remedial help in deficient areas. Counselling services are an integral part of this process. Increased awareness of market conditions will reduce unrealistic employment expectations and help students establish long term career goals. Education must not be seen as a quick fix, but as an ongoing process with long term benefits.

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